

EJERCICIOS OPERACIONES CON FUNCIONES

Dadas las funciones:

$$f(x) = x + 2$$

$$g(x) = \sqrt{x}$$

$$h(x) = \frac{2}{x-1}$$

Calcula:

1)  $f \circ g$

2)  $g \circ f$

3)  $f \circ h$

4)  $h \circ f$

5)  $g \circ h$

6)  $h \circ g$

7)  $f^{-1}$

8)  $g^{-1}$

9)  $h^{-1}$

**SOLUCIONES**

$$1) (f \circ g)(x) = f[g(x)] = f[\sqrt{x}] = \sqrt{x} + 2$$

$$2) (g \circ f)(x) = g[f(x)] = g[x + 2] = \sqrt{x + 2}$$

$$3) (f \circ h)(x) = f[h(x)] = f\left[\frac{2}{x-1}\right] = \frac{2}{x-1} + 2 = \frac{2 + 2x - 2}{x-1} = \frac{2x}{x-1}$$

$$4) (h \circ f)(x) = h[f(x)] = h[x + 2] = \frac{2}{(x+2)-1} = \frac{2}{x+1}$$

$$5) (g \circ h)(x) = g[h(x)] = g\left[\frac{2}{x-1}\right] = \sqrt{\frac{2}{x-1}}$$

$$6) (h \circ g)(x) = h[g(x)] = h[\sqrt{x}] = \frac{2}{\sqrt{x}-1}$$

$$7) f[f^{-1}(x)] = x \Rightarrow f^{-1}(x) + 2 = x \Rightarrow f^{-1}(x) = x - 2$$

$$8) g[g^{-1}(x)] = x \Rightarrow \sqrt{g^{-1}(x)} = x \Rightarrow (\sqrt{g^{-1}(x)})^2 = x^2 \Rightarrow g^{-1}(x) = x^2$$

$$9) h[h^{-1}(x)] = x \Rightarrow \frac{2}{h^{-1}(x)-1} = x \Rightarrow 2 = x \cdot h^{-1}(x) - x$$

$$\Rightarrow 2 + x = x \cdot h^{-1}(x) \Rightarrow h^{-1}(x) = \frac{2+x}{x}$$